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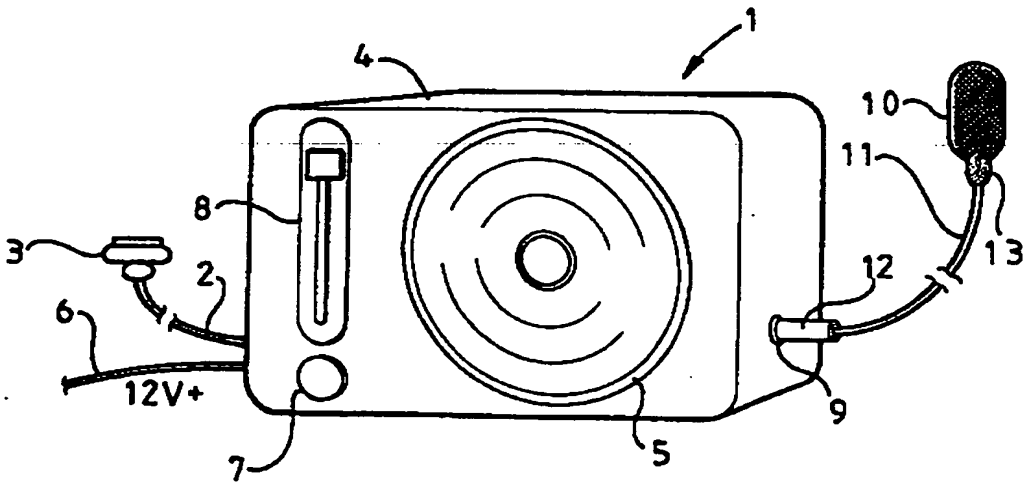

(57) Abstract

A mobile telephone extension unit (1) comprises a remote housing (4) adapted to be located in the vicinity of an upper part of a car dashboard. A loudspeaker (5) and booster amplifier are provided within the housing (4), and a connecting cable (2) connects the unit (1) to a mobile telephone when the telephone is received within a holder located in the vicinity of a lower part of the car dashboard. Since the loudspeaker (5) is positioned at a location which is much closer to the driver's ears, and in view of the boosting of the voice signal by the amplifier, such a unit will considerably enhance the voice quality heard by the driver. In addition a remote microphone (10) may be connected to the unit (1) by a microphone lead (11), the microphone (10) being mounted on the car windscreen so as to be in the best position for receiving voice signals from the driver.

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"Mobile Telephone Extension Units"

This invention relates to extension units for mobile telephones for use in cars and the like.

Mobile telephones, operating on one of the mobile telephone operating networks now in place, are widely used in cars to permit communication by telephone when travelling. Since it is dangerous for a person to hold a telephone handset when driving, many mobile telephones used in cars are now of the hands-free type which can be used by the driver of a car without the necessity to hold a handset.

It is known to install a holder for a mobile telephone in a car so that the telephone can be removably mounted in the holder, and optionally so that, when the telephone is received within the holder, it is automatically charged from the car battery. Furthermore it is known for such a holder to incorporate an integral loudspeaker which is connectible to the telephone when within the holder to boost the level of the received voice signal. It is also known for such a holder to be adapted to permit connection of an external microphone to the telephone so that the voice input to the telephone can be picked up by such a microphone mounted on the windscreen of the car.

However such holders incorporating integral loudspeakers are bulky and, as a result, cannot easily be located in a convenient position and often do not present an attractive appearance. Also existing hands-free

installations suffer from the fact that the received voice signal can be difficult to hear, particularly under conditions of poor signal strength and where the ambient noise due to engine noise, wind resistance and the like is high.

It is an object of the invention to provide a novel mobile telephone extension unit which serves to at least partially alleviate these problems.

According to the present invention there is provided a mobile telephone extension unit comprising a remote housing adapted to be located in the vicinity of an upper part of a car dashboard, a loudspeaker within the housing, a booster amplifier within the housing, and a connecting cable for connecting the unit to a mobile telephone when such a telephone is received within a holder located in the vicinity of a lower part of the car dashboard so as to supply a voice signal from the telephone to the amplifier and loudspeaker.

Since the loudspeaker is positioned at a location which is much closer to the driver's ears, and in view of the boosting of the voice signal by the amplifier, such a unit will considerably enhance the voice quality heard by the driver. Also, since the housing containing the loudspeaker is separate from the telephone holder, the holder can be made of a small size so that it can be neatly located in a convenient position on the dashboard and so that the holder itself is largely concealed when the telephone is in position.

In order that the invention may be more fully understood, a preferred mobile telephone extension unit in accordance with the invention will now be described, by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a schematic perspective view of the unit;

Figure 2 is a perspective view of the installed unit, and

Figure 3 is a perspective view of the back of the unit.

The mobile telephone extension unit 1 illustrated in the drawing is provided with a connecting cable 2 having at its free end a telephone multiconnector 3 of a type which is adapted to be received in a receiving socket (not shown) provided in the lower part of certain mobile telephones so that electrical contact is made between a series of contacts on the multiconnector 3 and complementary contacts provided within the socket. When the multiconnector 3 is received within the socket of the telephone to establish such an electrical connection, input and output audio signals can be transmitted along the cable 2 between the telephone and the extension unit 1.

The extension unit 1 comprises a moulded plastics housing 4 containing a loudspeaker 5 and a booster amplifier (not shown) by means of which audio signals output from the telephone are amplified to drive the loudspeaker 5. The amplifier is supplied with power by a

power lead 6 provided at one end with a plug (not shown) of known type for insertion into a cigarette lighter socket for connection to the car power supply. Furthermore the unit 1 includes a push-button on/off switch 7 and a slider volume control 8 for controlling the gain of the amplifier. A microphone connector in the form of a socket 9 may be provided at one side of the housing 4 for connection of a remote microphone 10 by way of a microphone lead 11 and a connecting plug 12. The microphone 10 can be mounted on the car windscreen by means of a connecting pad 13 in conventional manner so as to be in the best position for receiving voice signals from the driver, and the resulting audio signals are supplied by the microphone lead 11 to the unit 1 and then by the connecting cable 2 to the audio input of the telephone.

In a variant of the above described arrangement the microphone is connected to the side of the unit 1 by means of a flexible arm which is hollow so as to accommodate the microphone lead.

Figure 2 shows the unit 1 connected to an upper part 14 of a car dashboard, the housing 4 being shown with a grill 15 protecting the loudspeaker. The housing 4 may be attached to the dashboard in any known manner, for example by gluing, by screwing, by self-adhesive strips or by Velcro strips, or by sliding connection with a complementary portion of a holding member previously connected to the dashboard for this purpose.

In accordance with conventional practice, the

telephone is mounted on a lower part of the dashboard within a holder attached to the dashboard and optionally including charging terminals for connecting to complementary charging terminals on the telephone for charging of the telephone battery when received within the holder. The multiconnector 3 is manually connectible to the receiving socket on the telephone when the telephone is received within the holder.

The back of the housing 4, as shown in Figure 3, is provided with a recess 20 incorporating an input multiconnector socket 21 into which an interface circuit 22 provided with a multiconnector plug 23 on the end of the connecting cable 2 may be plugged prior to fitting of a cover 24 to close off the recess 20 with the interface circuit 22 contained therein. The interface circuit 22 is adapted to provide an interface between a particular type of telephone and the main circuit board (not shown) within the housing 4, so that the unit 1 may be used in association with a large number of different types of telephone, provided that, in each case, a suitable connecting cable 2 provided with an appropriate interface circuit 22 is provided. It is a particular advantage of such an arrangement that a stockist need keep only a limited number of extension units in stock, together with a selection of different connecting cables 2 suitable for use with different types of telephone, rather than having to stock a large number of different types of extension unit for different telephones.

The connecting cable 2 as shown in Figure 3 is of a coiled expandable type and is fitted with a per se known telephone multiconnector 3 incorporating conductive pins 25 for engaging corresponding contacts within the telephone receiving socket, as well as two resilient hook members 26 which serve to mechanically connect the multiconnector 3 to the telephone base in known manner.

Although the means for fixing the housing 4 to the dashboard will generally be provided on the base of the housing 4, as described with reference to Figure 2, Figure 3 shows a possible connecting arrangement on the back of the housing 4 in the form of a tapering slot 27 which is closed at one end 28 and which has a cross-section which widens inwardly (as indicated by the broken lines denoting the widest extent of the slot 27). A holding member (not shown) connected to the dashboard by screwing, for example, is provided with a projection having a cross-section substantially matching the cross-section of the slot 27 so that, on sliding introduction of the projection into the slot 27 so that a rib 29 on the housing 4 engages within a matching groove in the holding member, a firm connection is established between the housing 4 and the holding member. It will be understood that such a connection arrangement may be provided on the base of the housing 4 where the housing 4 is to be connected to the dashboard in the manner described with reference to Figure 2.

CLAIMS

1. A mobile telephone extension unit comprising a remote housing (4) adapted to be located in the vicinity of an upper part of a car dashboard, a loudspeaker (5) within the housing, a booster amplifier within the housing (4), and a connecting cable (2) for connecting the unit to a mobile telephone when such a telephone is received within a holder located in the vicinity of a lower part of the car dashboard so as to supply a voice signal from the telephone to the amplifier and loudspeaker.

2. A unit according to claim 1, which is also provided with a microphone connector (9) for a remote microphone (10) from which a voice signal is transmitted to the telephone by way of the microphone connector (9) and the connecting cable (2).

3. A unit according to claim 2, which also includes a remote microphone (10) connected to the microphone connector (9) by a microphone lead (11).

4. A unit according to claim 1, 2 or 3, which additionally includes a power lead (6) for connecting the unit to the car power supply.

5. A unit according to claim 1, 2, 3 or 4, which is provided with an on/off switch (7).

6. A unit according to any preceding claim, which is provided with a volume control (8).

7. A unit according to any preceding claim, wherein the connecting cable (2) incorporates an interface circuit (22) at one end which is detachably connectible to an input

connector (21) on the housing (4).

8. A unit according to claim 7, wherein the input connector (21) is located within a recess (20) in the housing (4) which is also adapted to receive the interface circuit (22), and a cover (24) is provided for closing off the recess (20) when the interface circuit (22) is connected to the input connector (21).

9. A unit according to any preceding claim, wherein the connecting cable (2) is provided with a telephone connector (3) for mating with a complementary connector on the telephone when the telephone is received within the holder so as to permit transmission of voice signals between the telephone and the housing (4).

10. A unit according to any preceding claim, which also includes fixing means (27, 29) for attaching the unit to the car dashboard.

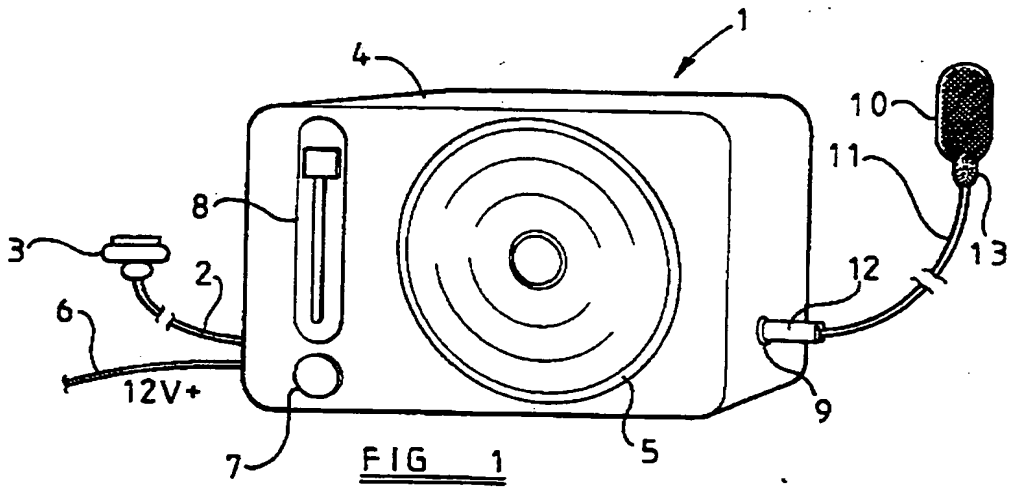

FIG 1

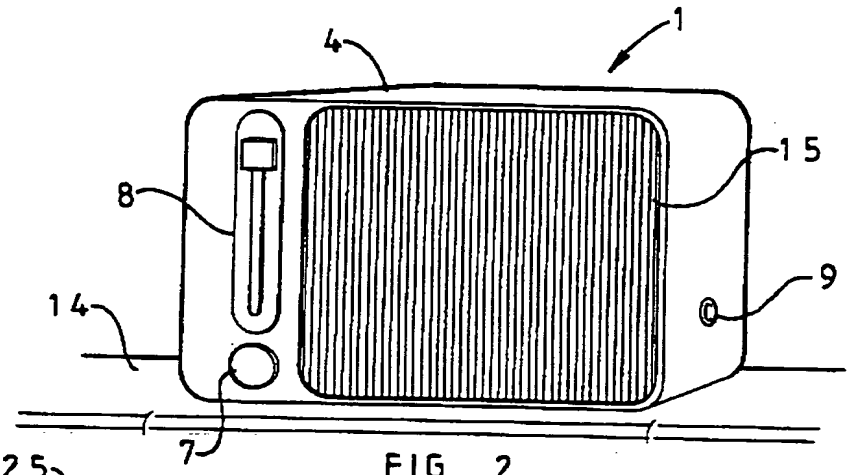

FIG 2

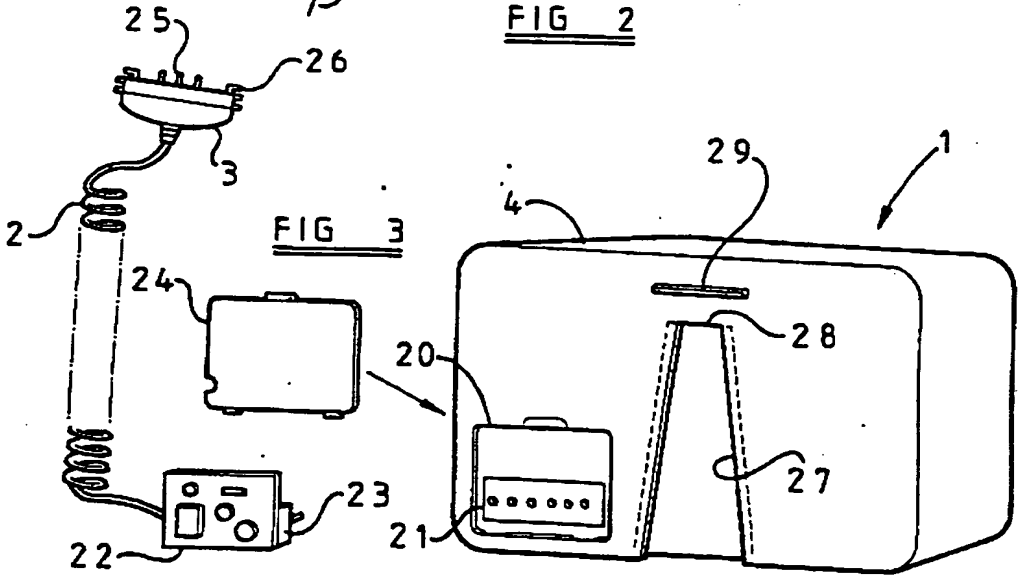

FIG 3

INTERNATIONAL SEARCH REPORT

Inter. nal Application No
PCT/GB 95/00131

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04B1/38 H04M1/72

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04B H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 310 318 (TOSHIBA) 5 April 1989 see column 5, line 31 - column 6, line 57; figures 7,8 see column 10, line 3 - line 14	1,4,5,9, 10
Y		2,3
A		6-8
Y	EP,A,0 412 852 (NEC) 13 February 1991 see column 5, line 33 - line 47; figures 1,2	2,3
A		1,4-6,10
A	WO,A,92 14328 (PROFINOR) 20 August 1992 see abstract; figure 1	1,4,9,10

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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20 April 1995	18.05.95

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Andersen, J.G.

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Information on patent family members

Inter. nal Application No
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		AU-B-	639010	15-07-93
		AU-A-	6095290	14-02-91
		CA-A,C	2022605	12-02-91
		US-A-	5261121	09-11-93
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